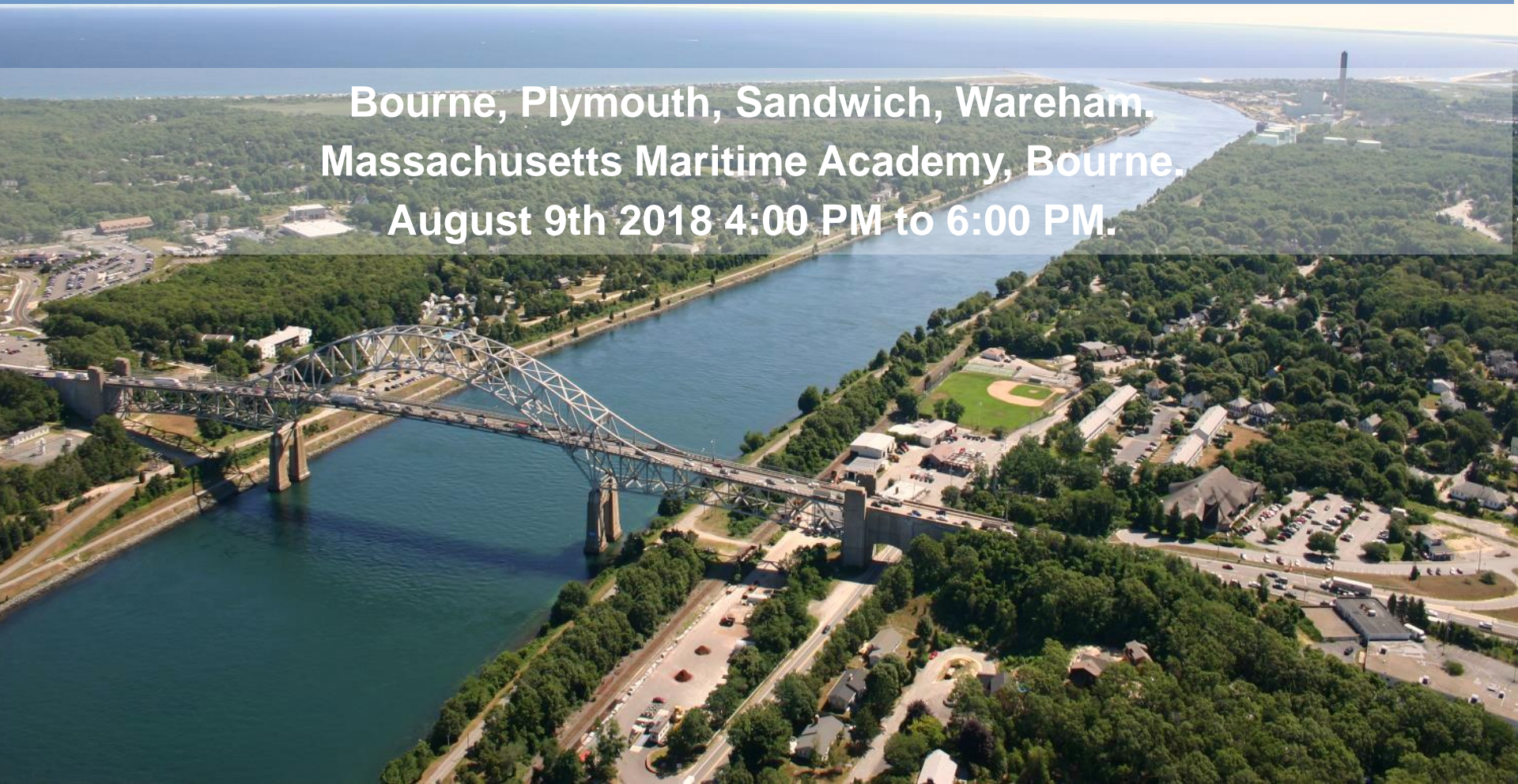


Cape Cod Canal Transportation Study, 11th Working Group Meeting.

Bourne, Plymouth, Sandwich, Wareham.
Massachusetts Maritime Academy, Bourne.
August 9th 2018 4:00 PM to 6:00 PM.



Working Group Meeting #11 Agenda.

1 Summary of Traffic Analysis Findings.

- Non-Summer.
- Summer.

2 Draft Study Recommendations.

3 Cost Estimate Summary.

4 Next Steps.

5 Video Simulations of Cases.

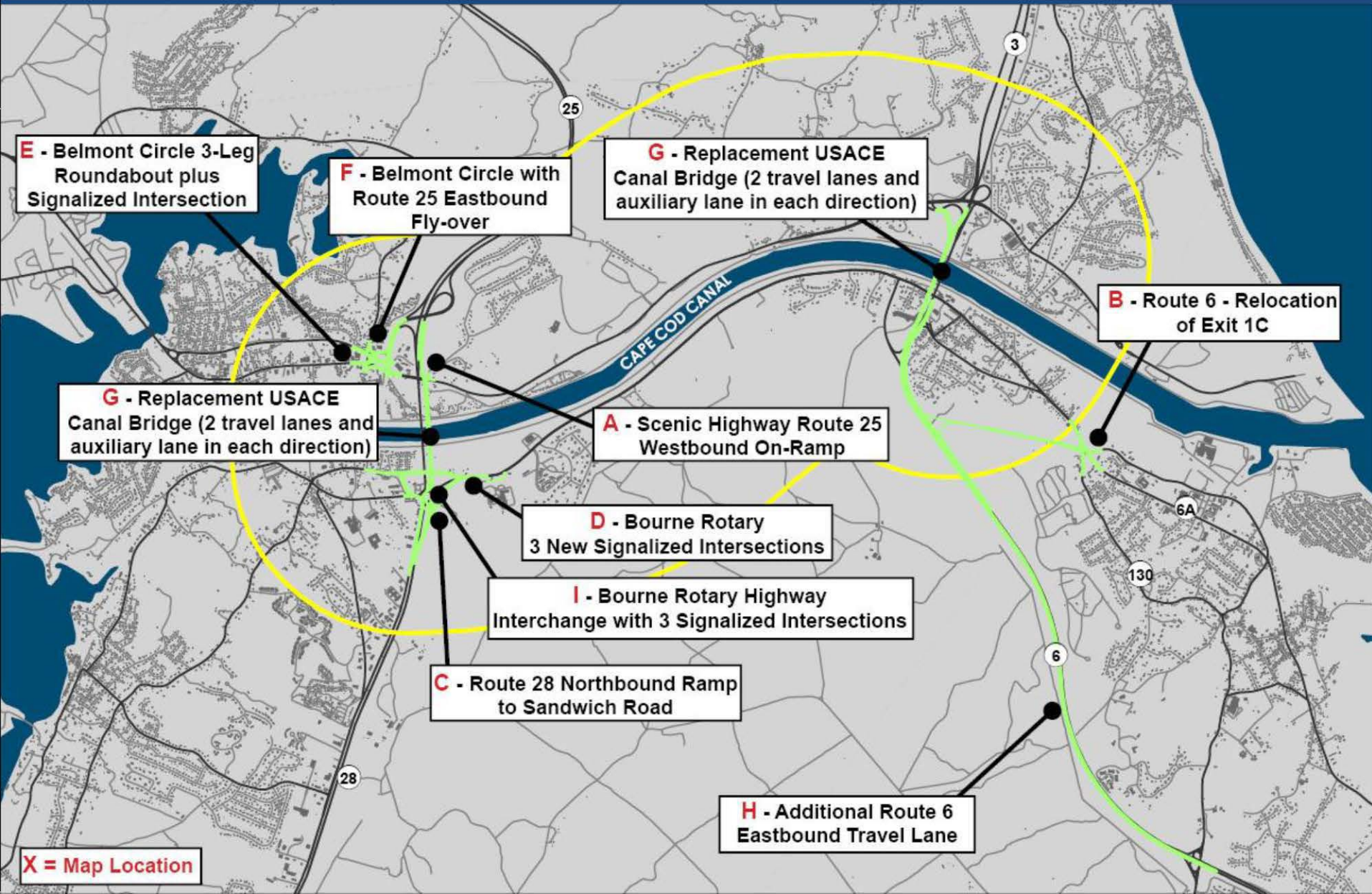
Summary of Travel Model Findings – Non-Summer Peak Period *(Weekday PM: 4:00PM – 6:00PM).*



Total of 7 Cases Evaluated.

TRAVEL DEMAND MODEL CASE IMPROVEMENTS								
Map Location	Improvements	Case 1	Case 1A	Case 1B	Case 2	Case 2B	Case 3	Case 3A
A	Scenic Highway to Rte 25 Westbound On-Ramp	●	●	●	●	●	●	●
B	Rte 6 Exit 1C Relocation	●			●	●	●	●
C	Rte 28 Northbound Ramp to Sandwich Road		●	●	●	●	●	
D	Bourne Rotary (Three New Signalized Intersections)			●	●	●	●	
E	Belmont Circle (3 Leg Roundabout plus Signalized Intersection)				●		●	●
F	Belmont Circle with Rte 25 Eastbound Fly-over					●		
G	Replacement Bridges (Bourne and Sagamore) - 2 travel lanes with auxiliary lane in each direction						●	●
H	Additional Rte 6 Eastbound Travel Lane from Exit 1A to Exit 2 (3 total lanes)						●	●
I	Bourne Rotary with Highway Interchange							●

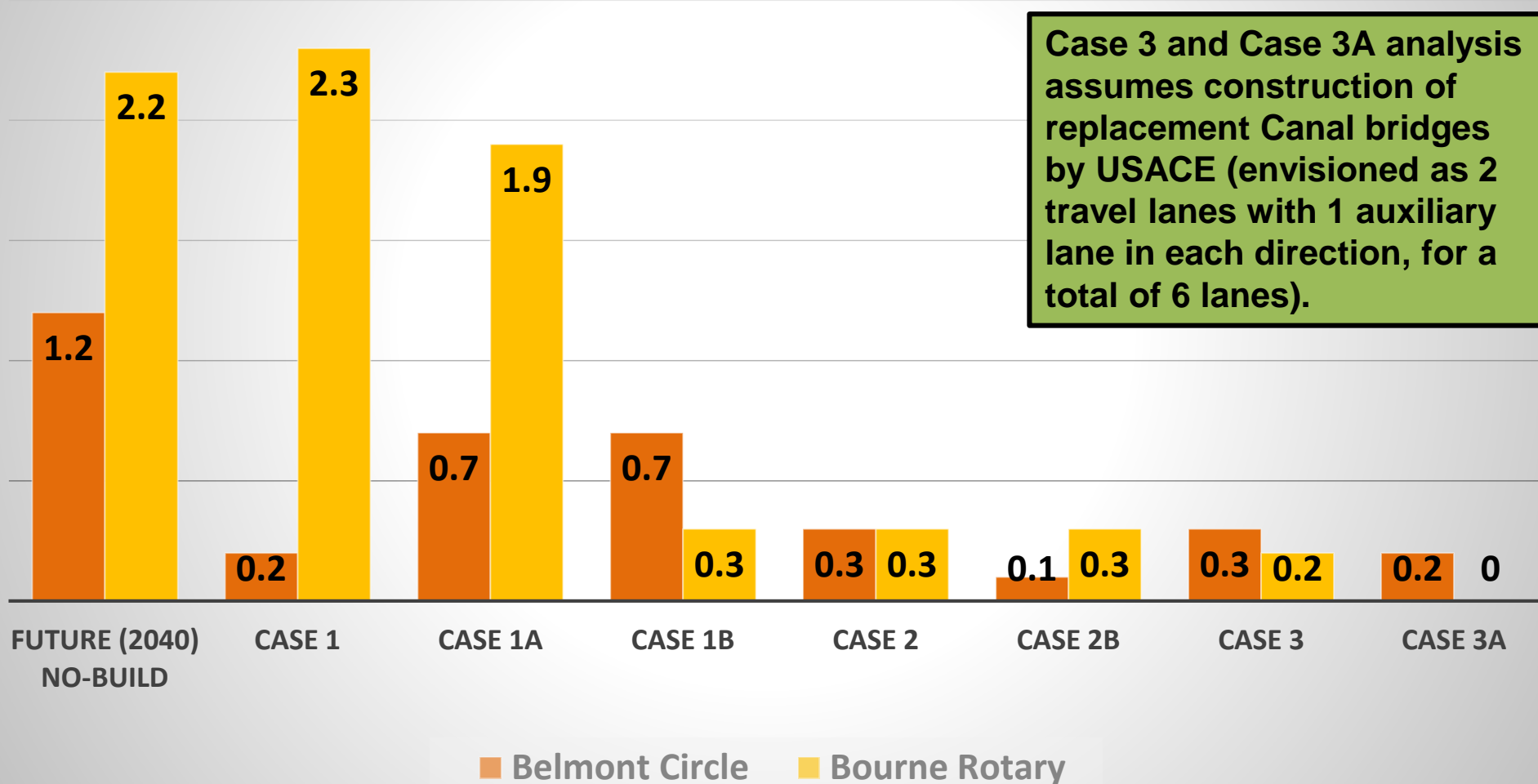
Elements of Cases Analyzed.



Traffic Analysis Findings

Bourne Bridge Area, Non-Summer.

Belmont Circle and Bourne Rotary Overall
Average Delays (mins).



Traffic Analysis Findings

Bourne Bridge Area, Non-Summer.

Cases 1B, 2, 2B, and 3A would provide progressively greater reductions in delay during the non-summer time periods at Belmont Circle and Bourne Rotary.

New ramps would remove traffic from Rotaries.

- Scenic Highway westbound to Route 25 on-ramp (Element/Map Location A).
- Route 28 north to Sandwich Road eastbound ramp (Element/Map Location C).

New Signal and Roundabout at Belmont Circle (Element E) would improve traffic flow.

- New traffic signal and roundabout at circle would reduce congestion by controlling traffic flow from Route 25, Main Street, Buzzards Bay Bypass, and Scenic Highway.

Traffic Analysis Findings

Bourne Bridge Area, Non-Summer.

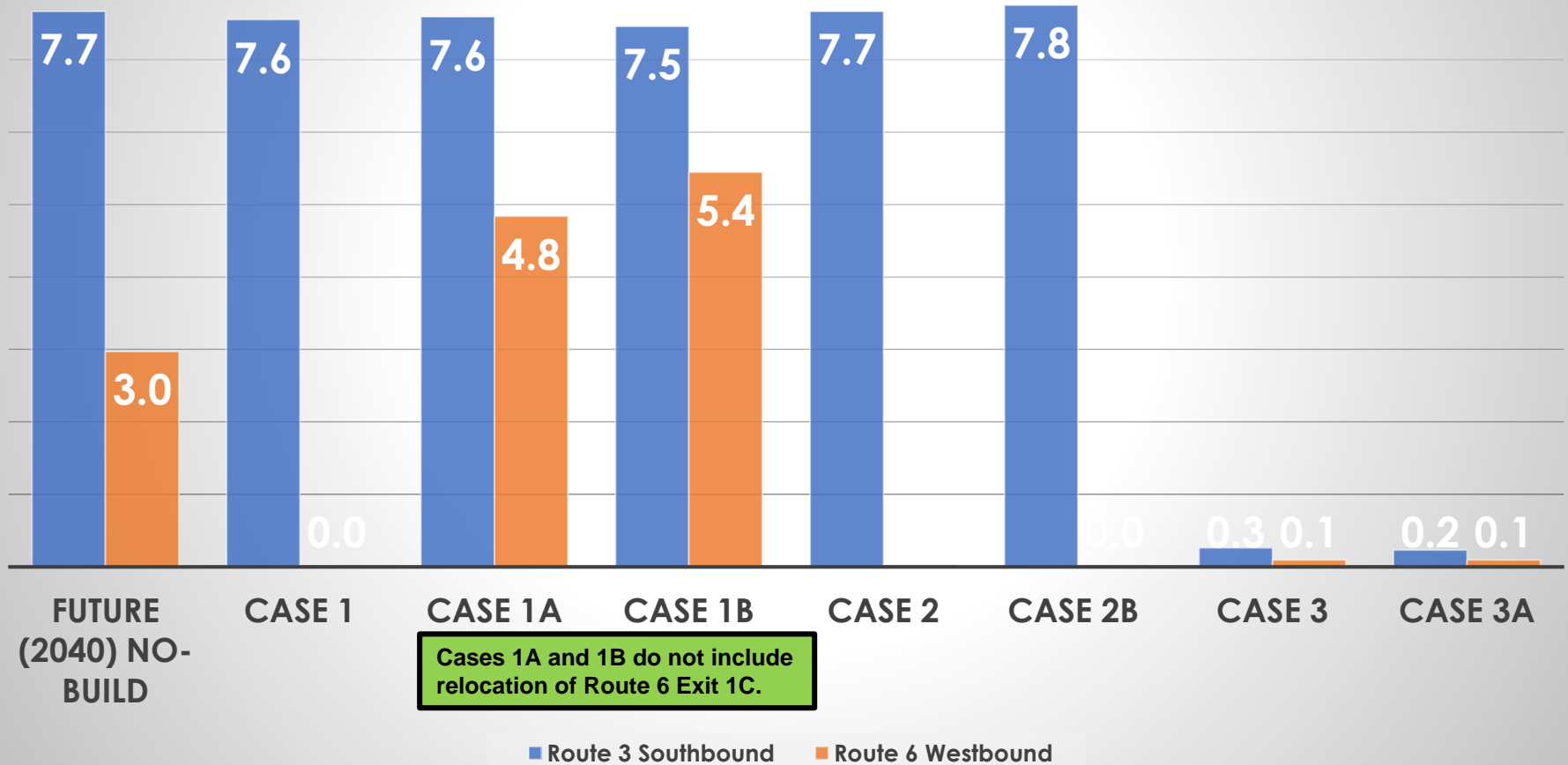
Bourne Rotary Interchange (Element/Map Location I) would reduce vehicular conflict.

- Bourne Rotary Interchange would separate local and regional traffic.
- Regional traffic (with destinations on Route 28 and beyond) would avoid conflict with local Bourne area traffic which would use Sandwich Road for east-west travel.

Traffic Analysis Findings

Sagamore Bridge Non-Summer.

Non-Summer PM Operations for
Sagamore Bridge - Average Delay (mins).



Traffic Analysis Findings

Sagamore Bridge Area, Non-Summer.

- Relocation of Route 6 Exit 1C (Element/Map Location B):
 - Would result in substantial delay reduction for Route 6 westbound (off-cape) from elimination of conflict at south end of Sagamore Bridge.
 - Would provide sufficient acceleration and deceleration distances at relocated Exit 1C on and off-ramps.
- Cases 1A and 1B **do not** include Exit 1C relocation (Element/Map Location B) and would not see Route 6 westbound improvements.
- Case 3A - Delay reduction on Route 3 southbound would occur with replacement of the Sagamore Bridge (Element/Map Location G) and additional Route 6 eastbound travel lane to Exit 2 (Element/Map Location H).

Summary of Traffic Analysis Findings

Summer Peak Period

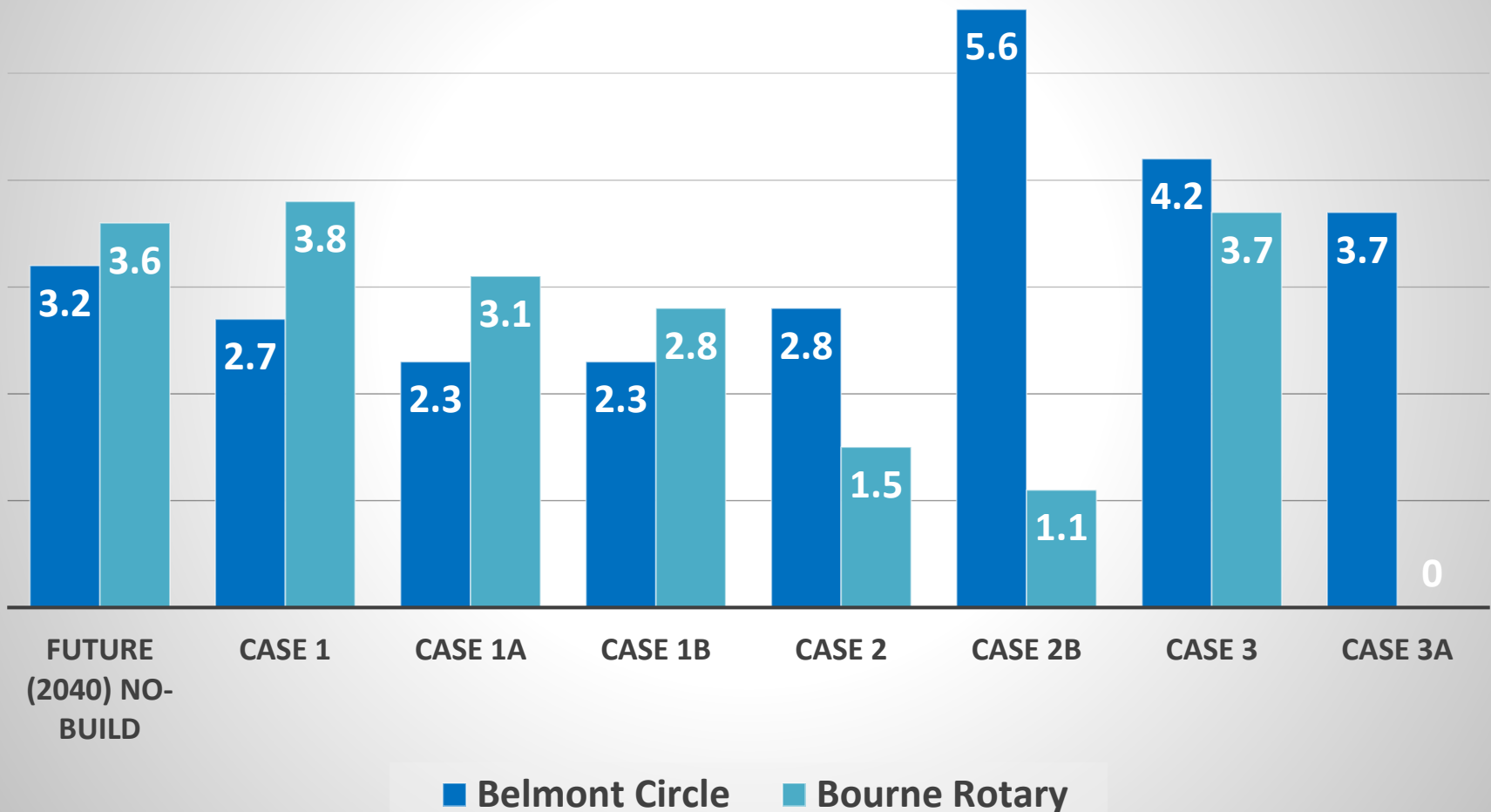
(Saturday: 10:00AM-12:00PM).



Traffic Analysis Findings

Bourne Bridge Area - Summer.

Belmont Circle and Bourne Rotary Overall
Average Delays (mins).



Traffic Analysis Findings

Bourne Bridge Area - Summer.

Belmont Circle:

- During summer peak period, more modest delay reductions could be achieved at Belmont Circle for Cases 1, 1A, 1B, and 2.
- Under Cases 2B, 3, and 3A, more freely-flowing traffic entering roundabout from Route 25 would result in fewer gaps for vehicles attempting to enter Belmont Circle from Main Street, Scenic Hwy, and Head of Bay Road. This would cause additional overall delay under these cases.

Traffic Analysis Findings

Bourne Bridge Area - Summer.

BENEFITS:

- Up to 300 additional vehicles would be processed through Belmont Circle during peak hour for Cases 1B, 2, 2B, 3, and 3A.
- Regionally, there would be a reduction in travel times:

For example: Future summer travel time from Route 25 Exit 2 (Glen Charlie Road) to Route 6 Exit 2 (Route 130) would be reduced by 12.1 minutes (via Sandwich Road) under Case 3.

Traffic Analysis Findings

Bourne Rotary - Summer.

Bourne Rotary

- Steadily decreasing delays could be achieved during summer peak period at Bourne Rotary under Cases 1B, 2, 2B, and 3A.
- Case 3 would be less effective because a reconstructed Bourne Rotary (Three New Signalized Intersections – Element/Map Location D) could not effectively process the additional 700 vehicles that would be attracted to a replacement Bourne Bridge (Element/Map Location G) diverted from the Sagamore Bridge now crossing during peak hour.
- Case 3A - Construction of highway interchange (Element I) at Bourne Rotary (with replacement Bourne Bridge - Element/Map Location G) would be necessary to reduce summer delay.
- Case 3A – Auxiliary lanes on replacement Bourne Bridge (Element/Map Location G) would also be effective at reducing delay and conflict by providing acceleration and deceleration lanes.

Traffic Analysis Findings

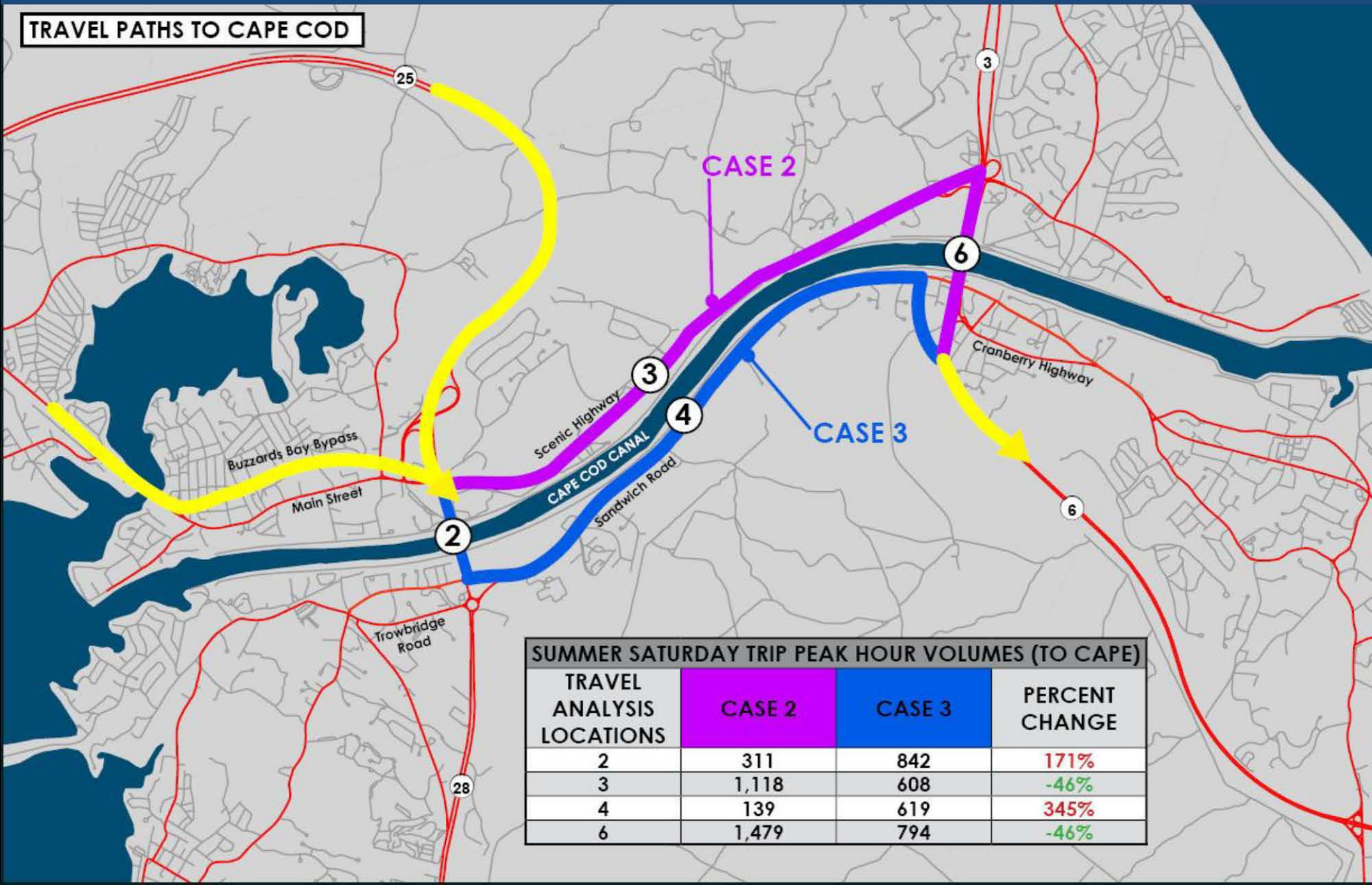
Changes in Travel Patterns.

WHY?:

- Currently, congested operations at Bourne Rotary discourage use of Bourne Bridge. Instead, vehicles exit Route 25 at Belmont Circle to travel east on Scenic Hwy and cross the Cape Cod Canal via Sagamore Bridge.
- Under Cases 3 and 3A, traffic operations would improve with replacement of the canal bridges (Element/Map Location G) , Exit 1C Relocation (Element/Map Location B) , Route 6 eastbound travel lane (Element/Map Location H) , & Belmont Circle (Element/Map Location E) and Bourne Rotary Interchange (Element/Map Location I) reconstructed.
- As a result, some Route 6-bound traffic would shift to more direct route to Bourne Bridge (via Sandwich Road) rather than Sagamore Bridge (via Scenic Hwy).

Travel Patterns for Trips to Cape Cod – Summer Peak Period.

TRAVEL PATHS TO CAPE COD



SUMMER SATURDAY TRIP PEAK HOUR VOLUMES (TO CAPE)			
TRAVEL ANALYSIS LOCATIONS	CASE 2	CASE 3	PERCENT CHANGE
2	311	842	171%
3	1,118	608	-46%
4	139	619	345%
6	1,479	794	-46%

Travel Patterns for Trips to Cape Cod – Summer Peak Period.

Using Bourne Bridge Southbound

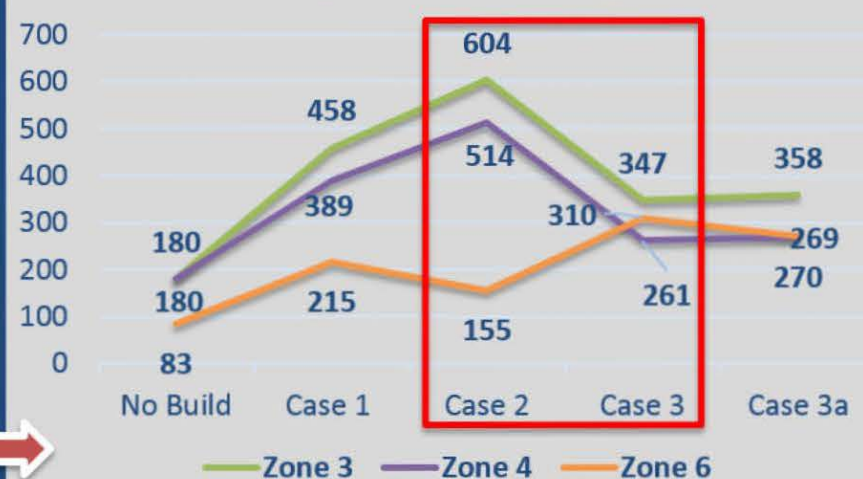
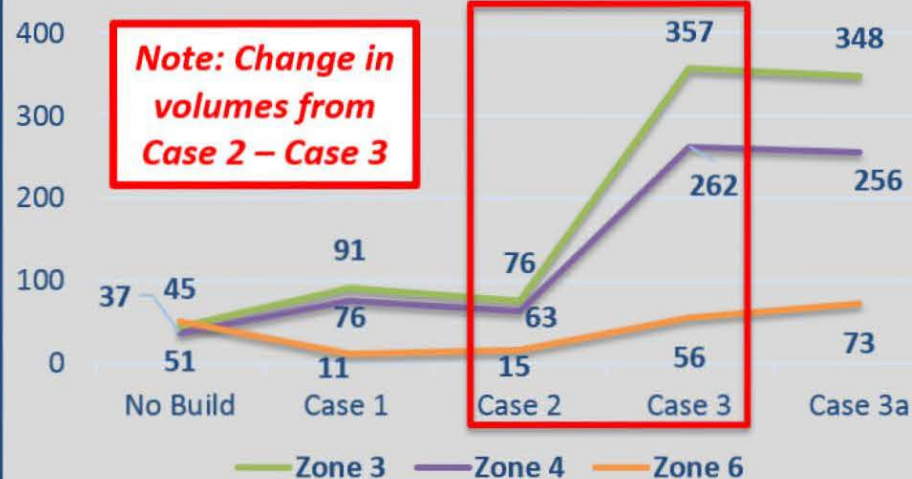


Using Sagamore Bridge Southbound



Using Sandwich Rd Eastbound

Using Scenic Hwy EB



Traffic Analysis Findings

Belmont Circle - Summer.

RESULT:

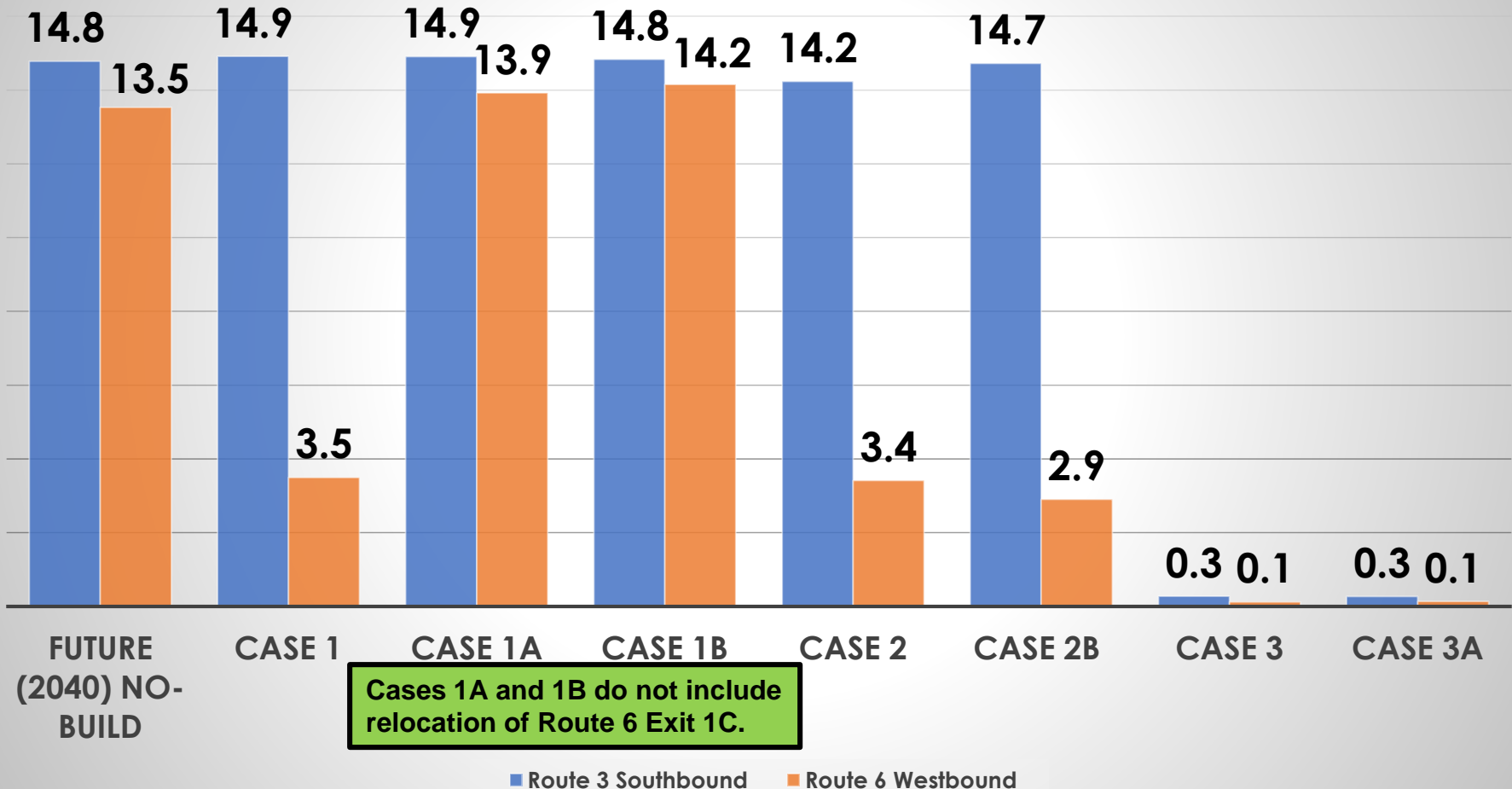
- Case 3A would result in a better balanced split of traffic using replacement Sagamore and Bourne Bridges (Element/Map Location G).

PEAK HOUR TRAFFIC			
TRAVEL ANALYSIS LOCATIONS	NO BUILD	CASE 2	CASE 3
Sagamore Bridge SB	3,975	4,000	3,350
Bourne Bridge SB	2,825	2,840	3,550

Travel Demand Model Findings

Sagamore Bridge - Summer.

Summer Saturday Operations for
Sagamore Bridge - Average Delay (mins)



Traffic Analysis Findings

Sagamore Bridge Area, Summer.

- Relocation of Route 6 Exit 1C (Element/Map Location B) would result in substantial delay reduction for Route 6 westbound (off-cape) for Cases 1, 2, 2B, 3, & 3A.
- Delay reduction on Route 3 southbound would occur under Cases 3 and 3A, with construction of replacement Sagamore Bridge (including 2 travel lanes and 1 auxiliary lane in each direction), and additional Route 6 eastbound lane.

Draft Study Recommendations.



Range of Draft Recommended Transportation Improvements.

- Multimodal:
 - Bicycle/Pedestrian.
 - Park & Ride Facilities.
- Roadway Improvements:
 - Local Intersections.
 - “Gateway” Locations.

Draft Study Recommendations – Multimodal.

Bicycle/Pedestrian Improvements:

- Would include accessible sidewalks & trails, crosswalks, pedestrian phases at intersections, bicycle accommodation in roadway shoulder.



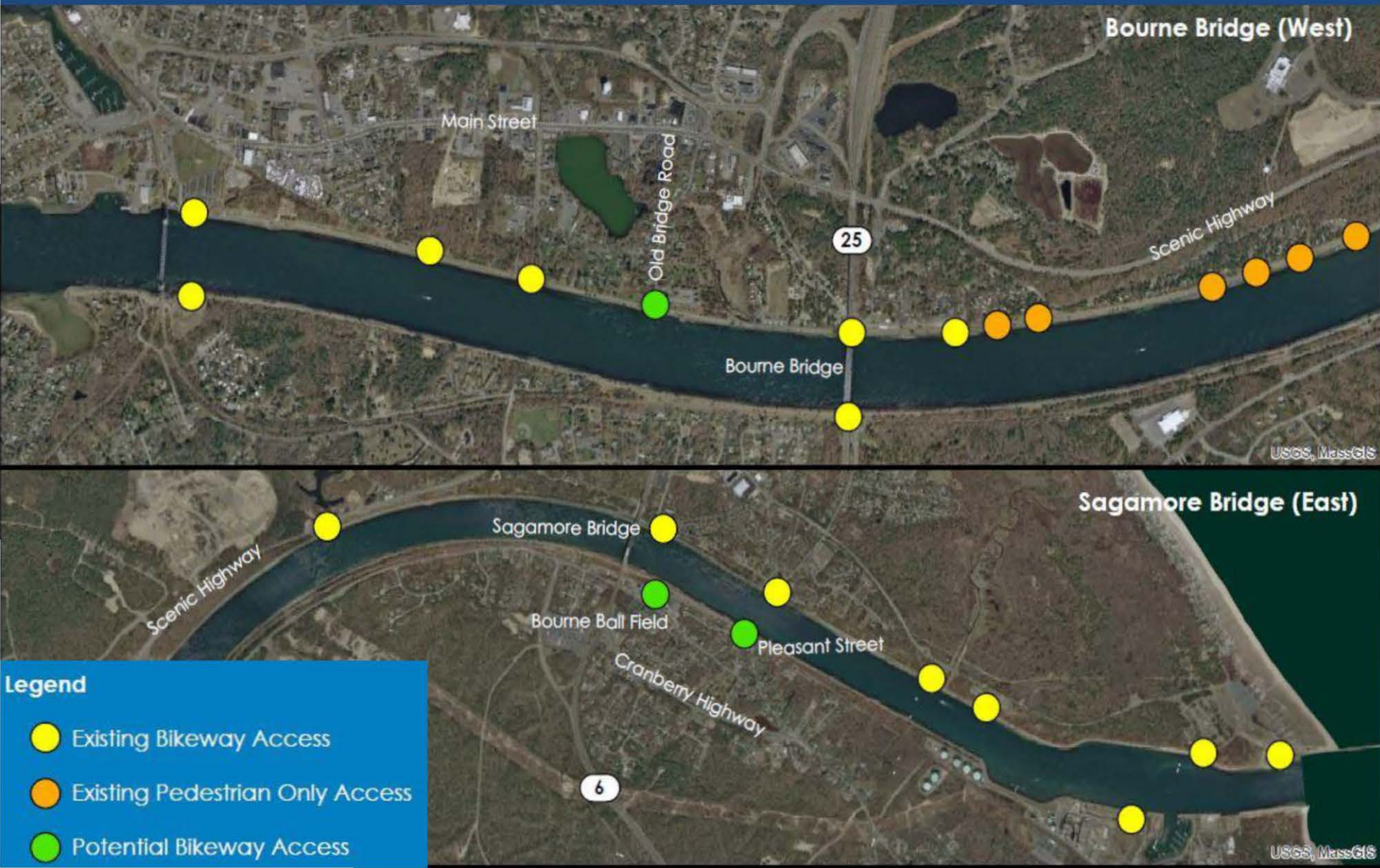
Draft Study Recommendations – Multimodal.

Bicycle/Pedestrian Improvements –

- Provide three new additional accessible connections to Canal bike trail.
- Improve bicycle/pedestrian facilities along Cape Cod Regional Transit Authority (CCRTA) bus routes.
- Provide accessible connections along roadway approaches to Sagamore and Bourne bridges (including ‘complete street’ design of Adams St.)

WHY? – More accessible connections provide more multimodal options for residents and visitors.

Draft Study Recommendations – Canal Trail Connections.



Draft Study Recommendations – Bike-Ped Facilities along Bus Routes.



- Legend
- Focus Area
 - Existing On-Road Bicycle Facilities
 - Existing Off-Road Bicycle Facilities
 - Bus Route - CCRTA Bourne Route
 - Bus Route - CCRTA Sandwich Line
 - Bus Route - CCRTA Seaside Route

Bicycle/Pedestrian Access: Sagamore Bridge Approaches & Adams Street Complete Street Improvements.



Bicycle/Pedestrian Access: Bourne Bridge (North of Canal).



- RECONSTRUCT AND WIDEN SIDEWALK.
- ADD LANE STRIPING AND SIGNAGE.



KEY MAP

NOTE: SIDEWALK IMPROVEMENTS **SOUTH** OF CANAL WERE COMPLETED BY MASSDOT IN 2017.

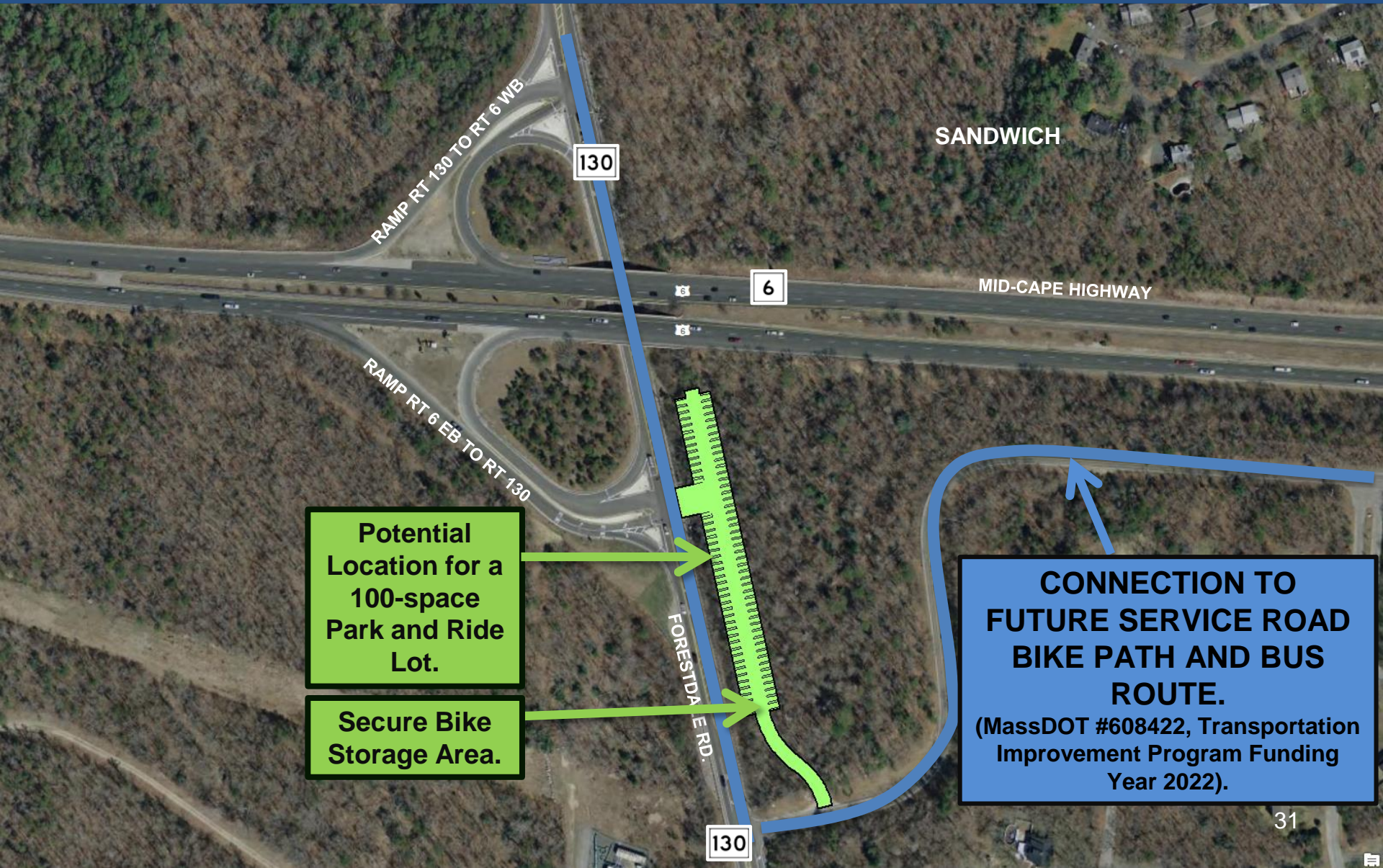
Draft Study Recommendations – Multimodal.

Park & Ride Facilities:

- Construct new Park & Ride lot at Route 6 Exit 2.
- Potential new Plymouth & Brockton commuter bus stop.
- Provide connection to new Service Road bike path.
- Provide bicycle storage facilities.

WHY? – Encourages use of alternate modes of transportation.

Park & Ride Facility/Lot Route 6 at Route 130.



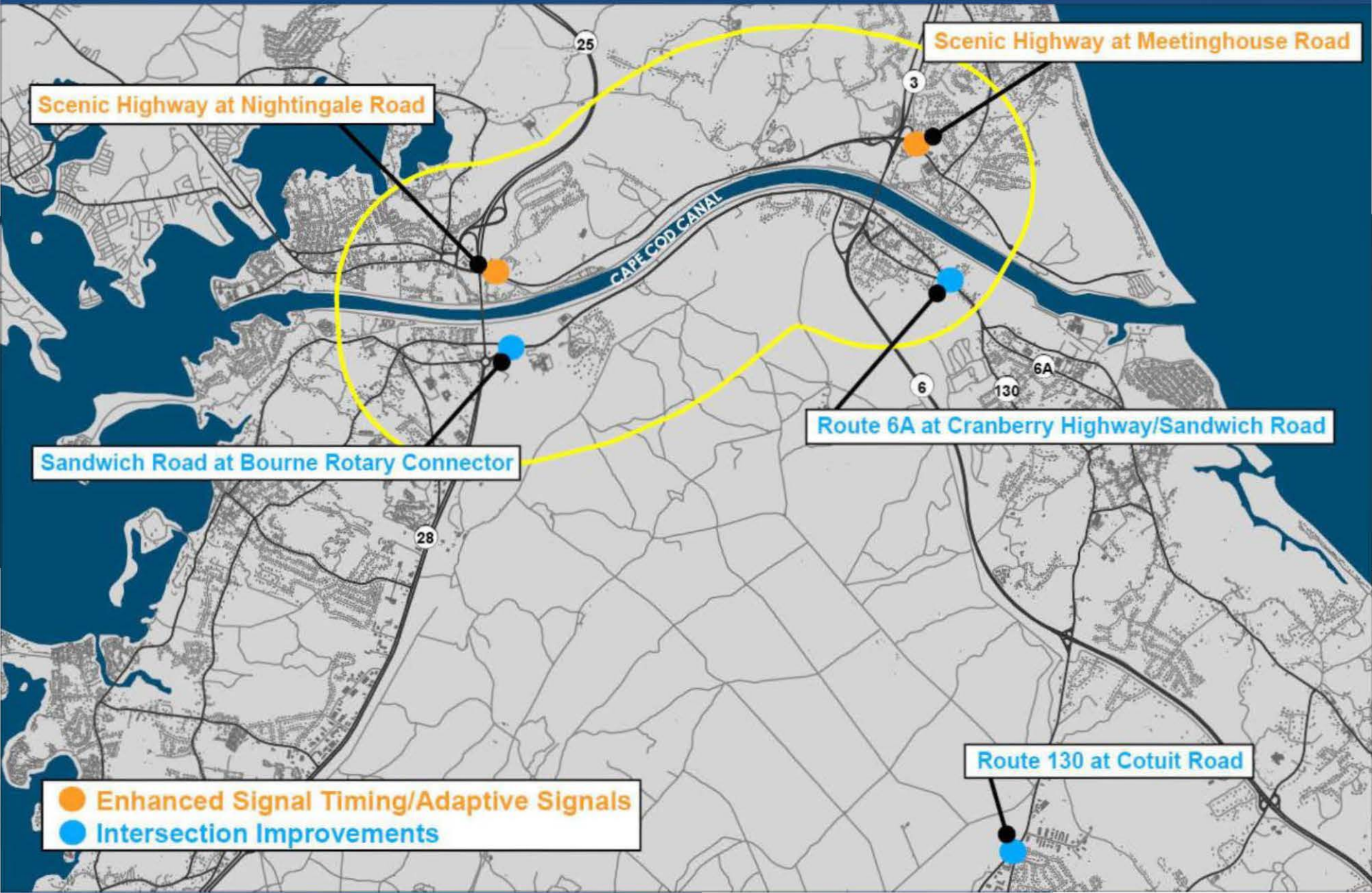
**Potential
Location for a
100-space
Park and Ride
Lot.**

**Secure Bike
Storage Area.**

**CONNECTION TO
FUTURE SERVICE ROAD
BIKE PATH AND BUS
ROUTE.**

(MassDOT #608422, Transportation
Improvement Program Funding
Year 2022).

Local Intersections.

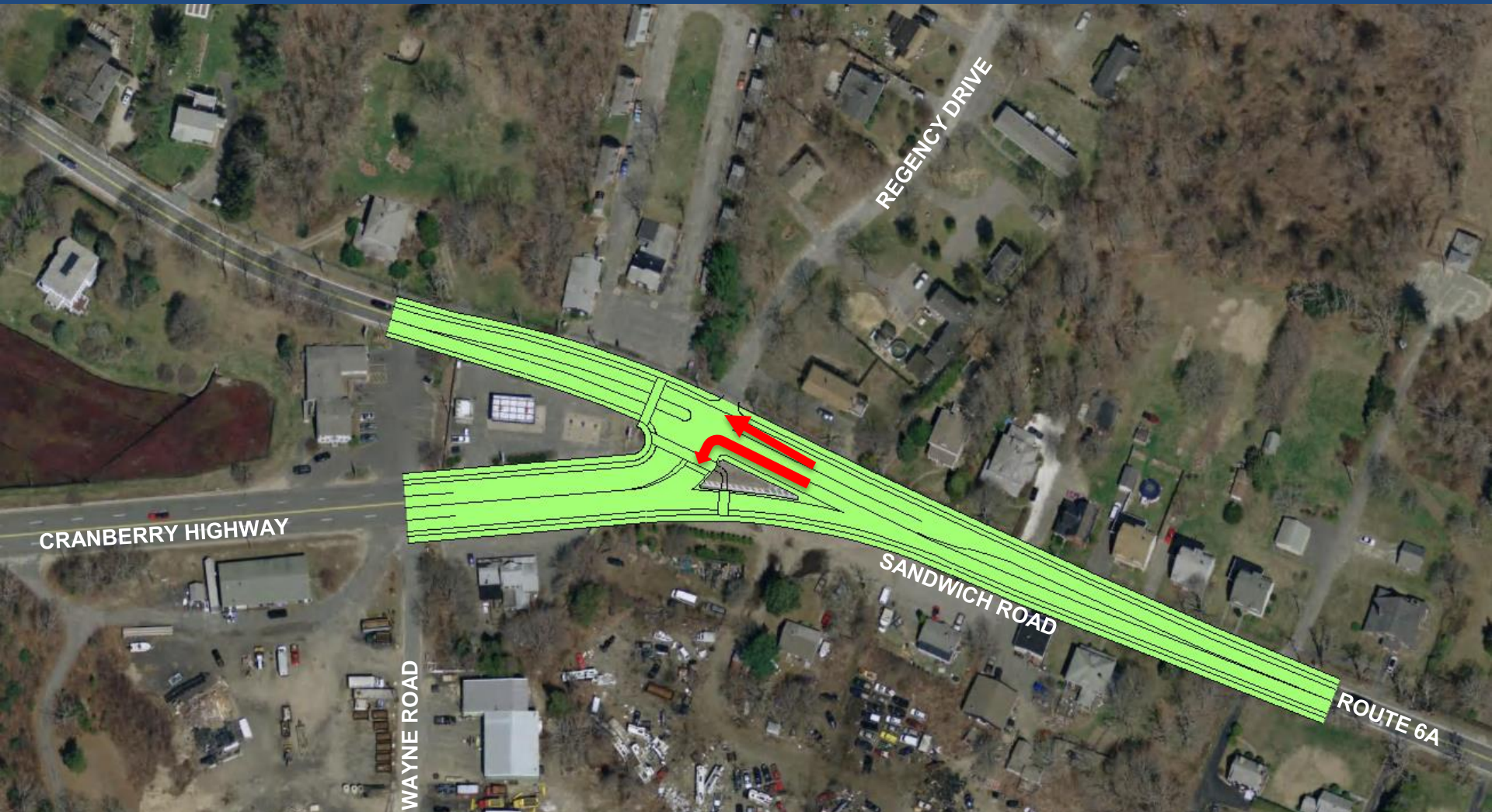


Draft Study Recommendations – Local Intersections.

Intersection/Signal Improvements –

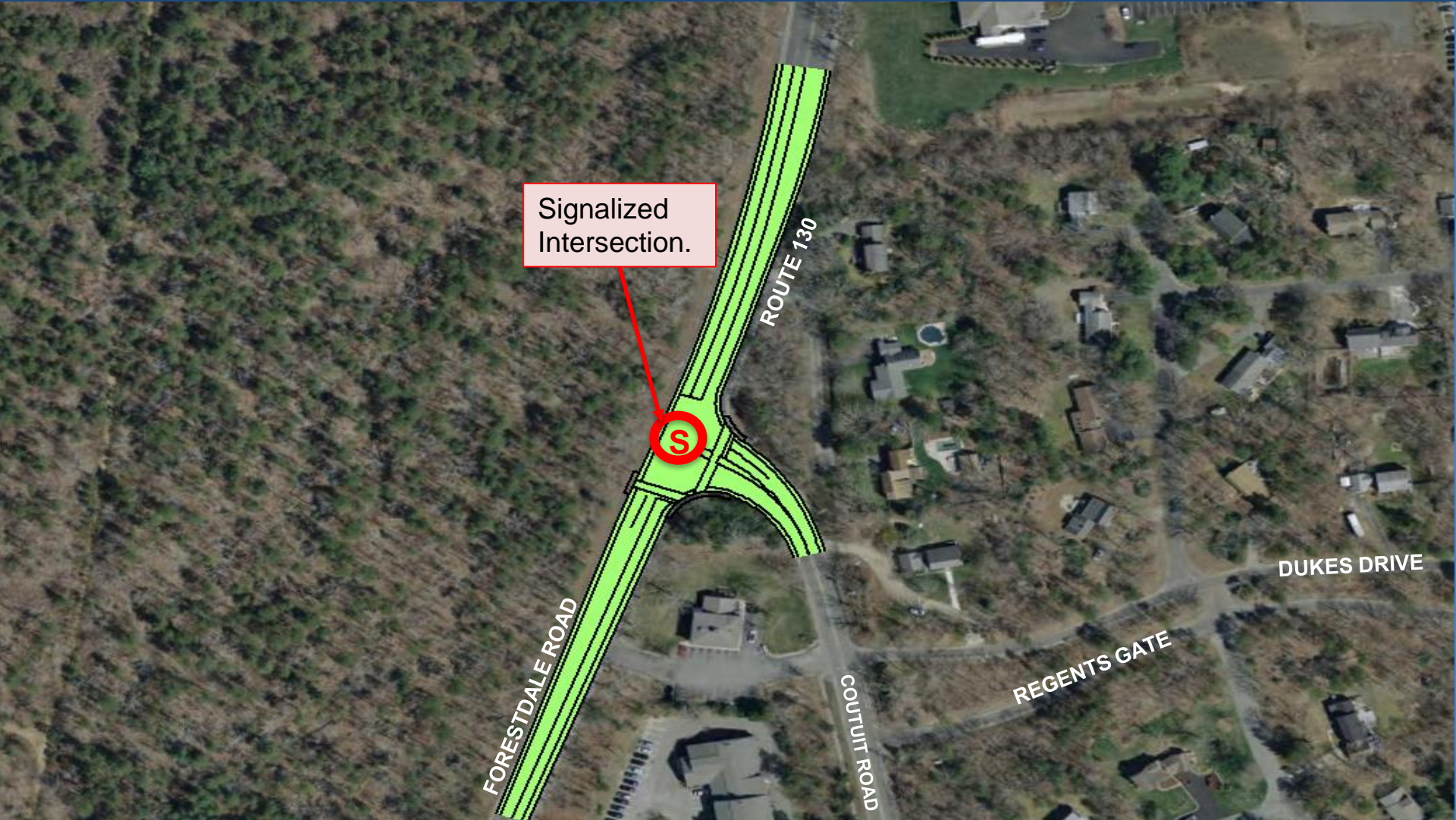
- Signal Timing / Adaptive Signal Improvements:
 - Scenic Hwy at Meetinghouse Road.
 - Scenic Hwy at Nightingale Road.
- Route 6A at Cranberry Highway/Sandwich Road:
 - New turning lane.
- Route 130 at Cotuit Road:
 - Install traffic signal.
- Sandwich Road at Bourne Rotary Connector:
 - New traffic signal and through lane.

Route 6A at Cranberry Highway/ Sandwich Road, Bourne.



Proposed: Add exclusive left-turn lanes on westbound approach.
ADA-compliant sidewalks and crosswalk on all approaches.

Route 130 at Cotuit Road, Sandwich.



Signalized
Intersection.

ROUTE 130

FORESTDALE ROAD

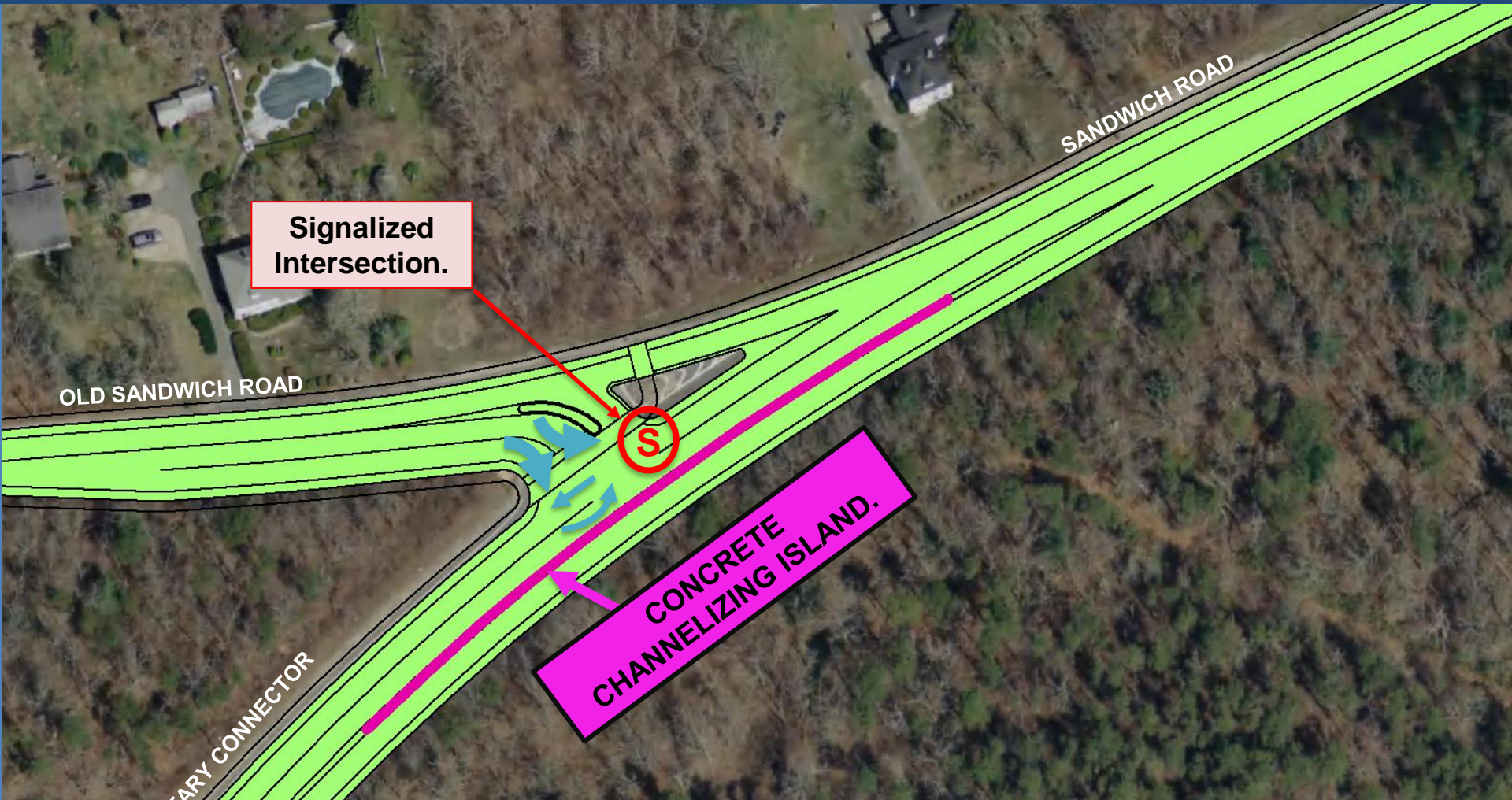
COTUIT ROAD

REGENTS GATE

DUKES DRIVE

Proposed: Signalized Intersection.
ADA-compliant sidewalks and crosswalk on all approaches.

Sandwich Rd/Bourne Rotary Connector, Bourne 'Florida T' Intersection.



Proposed: Signalized Intersection. Connector to Sandwich Road through lane.
ADA-compliant sidewalks and crosswalk on all approaches.

Draft Study Recommendations – “Gateway” Locations.

Case 3A Elements/Improvements Satisfy the Study Goals and Objectives:

- Improvements analyzed under Case 3A would provide the greatest long-term benefits in accessibility and mobility for Cape Cod residents, employers, and visitors.
- Public Safety: Case 3A would provide a reliable multimodal transportation system in the event of an emergency evacuation of Cape Cod.
- Case 3A improvements focused on improving existing infrastructure, thereby minimizing anticipated impacts.

Draft Study Recommendations – “Gateway” Locations.

Elements/Map Locations of Case 3A Include:

- A. Scenic Highway westbound to Route 25 westbound on-ramp.
- B. Route 6 – Relocation of Exit 1C.
- E. Belmont Circle reconstruction as a 3-leg roundabout with signalized intersection.
- H. Route 6 eastbound travel lane to Exit 2.
- I. Bourne Rotary Interchange.

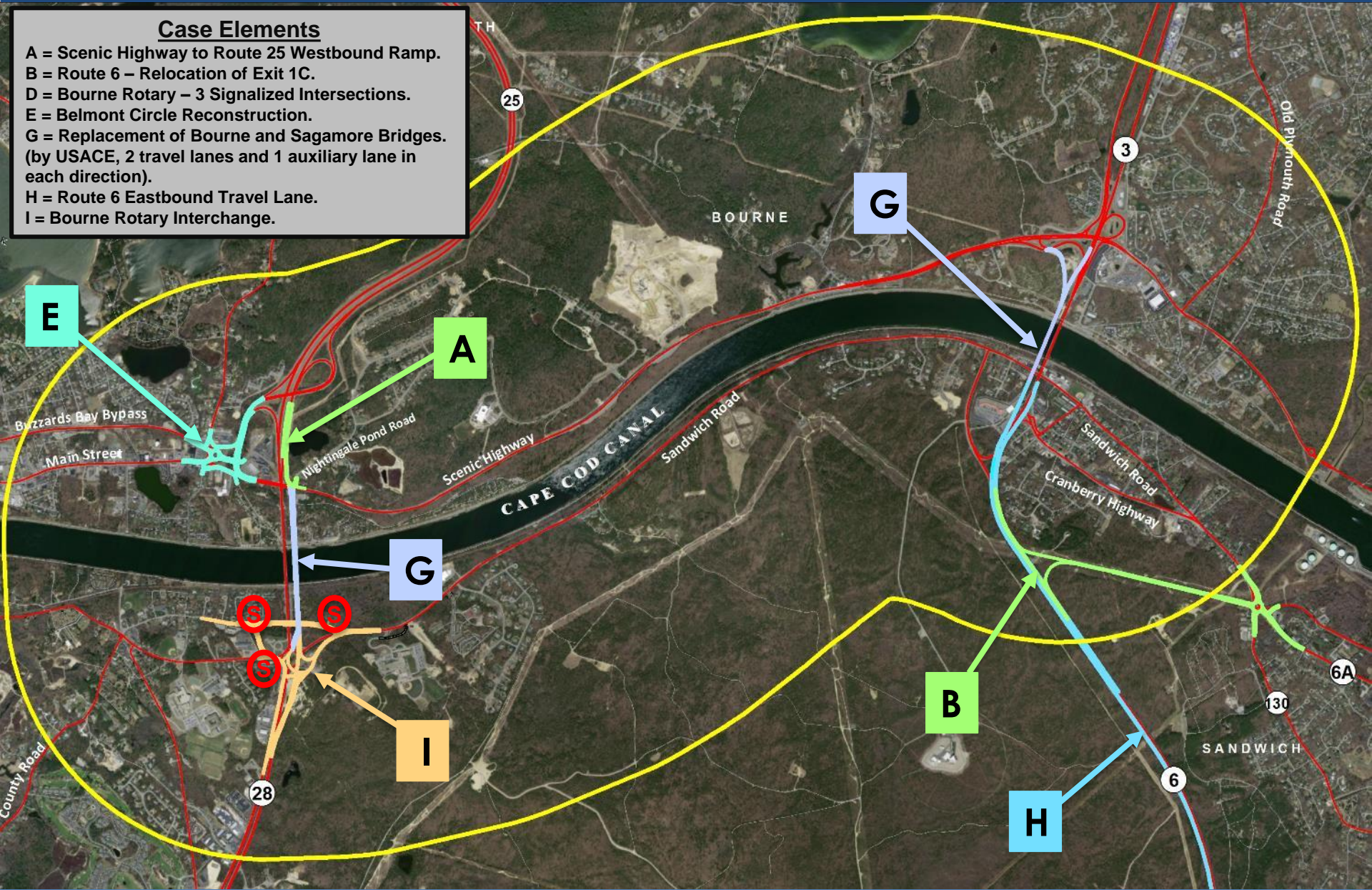
Draft Study Recommendations – “Gateway” Locations.

- The US Army Corps of Engineers (USACE) is currently conducting a study to determine the long-term disposition (Major Rehabilitation or Replacement) of the Bourne and Sagamore Bridges.
- MassDOT’s Draft Study Recommendations of improvements included in Case 3A assumes that USACE will be recommending replacement of both the Bourne and Sagamore Bridges (with 2 travel lanes and 1 auxiliary lane in each direction).

Travel Model Case 3A.

Case Elements

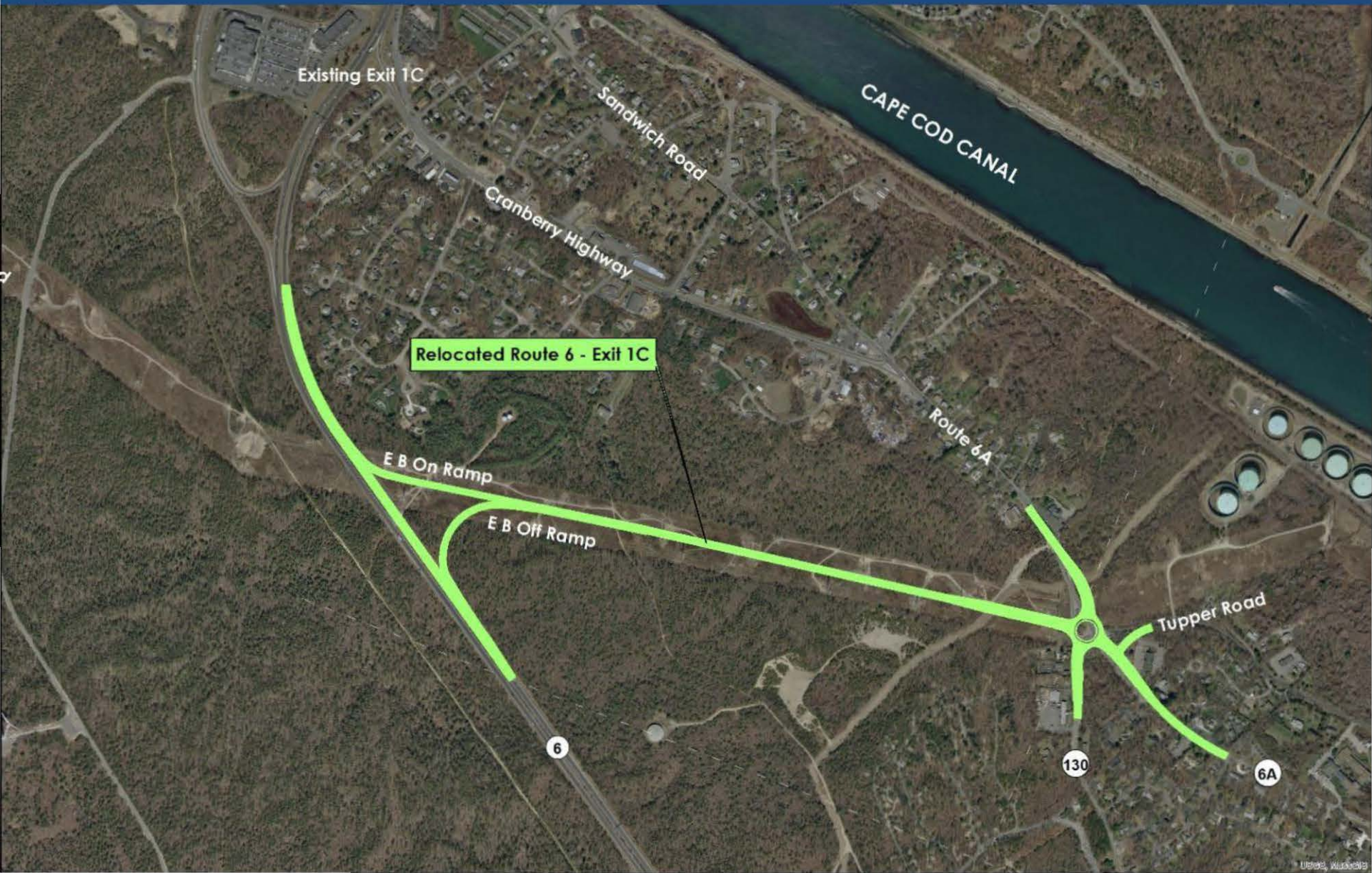
- A = Scenic Highway to Route 25 Westbound Ramp.
- B = Route 6 – Relocation of Exit 1C.
- D = Bourne Rotary – 3 Signalized Intersections.
- E = Belmont Circle Reconstruction.
- G = Replacement of Bourne and Sagamore Bridges. (by USACE, 2 travel lanes and 1 auxiliary lane in each direction).
- H = Route 6 Eastbound Travel Lane.
- I = Bourne Rotary Interchange.



Map Locations A and E: Scenic Highway to Route 25 Westbound On-Ramp, and Belmont Circle Reconstruction (3-Leg Roundabout with Signalized Intersection).



Map Location B: Route 6 Exit 1C Relocation.



Map Location H: Route 6 – Additional Eastbound Lane to Exit 2.



Map Location I: Bourne Rotary Highway Interchange.



Summary of Conceptual Cost Estimates by Case.

Cases	2030	2040
Case 1	\$70	\$105
Case 1A		\$30
Case 1B		\$65
Case 2		\$200
Case 2B		\$220
Case 3*		\$490
Case 3A*	\$400	\$590

**Includes cost of Sagamore and Bourne Bridge approaches.*

Next Steps.

- Final Public Meeting (September 2018).
- Draft Study Report – 30 day public comment period (September 2018).
- Project Development - After public review and comment on draft study recommendations, MassDOT intends to initiate the project development process.
- MassDOT will continue to coordinate with the USACE on their study of the Bourne and Sagamore bridges.